

State of Tennessee
RFI Sourcing Event #9325

Tennessee Department of Transportation

Geomatics System Specifications

1. SCOPE

- 1.1. The State of Tennessee, Tennessee Department of Transportation (TDOT), has existing Field Surveying equipment consisting of Topcon GNSS receivers (GR-3, GR-5), Topcon and Getac data collectors (FC-250, FC-236), Topcon total stations (GPT-9003A, GPT-7503, IS Imaging Station) and Topcon GNSS RTK network rovers (PG-S1, GRS-1). TDOT operates a statewide CORS network that utilizes Topcon antennas and receivers. Topcon field and office software is currently used to interface with this equipment and process the field data for use in MicroStation V8i and GEOPAK.
- 1.2. This specification establishes the technical requirements for the purchase of new survey grade GNSS field hardware, robotic total stations, and software, including Training, Maintenance, Warranty, and Delivery.
- 1.3. The State of Tennessee prefers to purchase hardware and software that will seamlessly connect to the existing Topcon Hardware listed in section 1.1 above. The State may purchase the items in any of the following methods:
 - 1.3.1. Data Collector Option 1 - **full keypad** - Carlson Surveyor 2, Spectra Ranger 3, or equivalent (ITB Line Item 1000158188)
 - 1.3.2. Data Collector Option 2 - **compact** - Carlson Mini2, Topcon FC-336, or equivalent (ITB Line Item 1000166070)
 - 1.3.3. Data Collector Option 3 - **tablet** – Carlson/Panasonic M1, Topcon Tesla RTK, or equivalent (ITB Line Item 1000166071)
 - 1.3.4. Field Data Collection Software – the latest version of Carlson SurvCE Software, or equivalent. (ITB Line Item 100166072)
 - 1.3.5. Office Processing Software – the latest version of Carlson SurveyGNSS Software and Carlson Survey Software, or equivalent. (ITB Line Item 100166073).
 - 1.3.6. GNSS receiver - Carlson BRx5, Topcon GR-5, Leica Viva series, or equivalent (ITB Line Item 1000141452)
 - 1.3.7. GNSS receiver – Carlson Surveyor+ GNSS System (ITB Line Item 1000170107)

- 1.3.8. Three Year Maintenance of Data Collector Option 1. (ITB Line Item 1000166076)
- 1.3.9. Three Year Maintenance of Data Collector Option 2. (ITB Line Item 1000166077)
- 1.3.10. Three Year Maintenance of Data Collector Option 3 (ITB Line Item 1000166078)
- 1.3.11. Three Year Maintenance of Office Processing Software (ITB Line Item 1000166079)
- 1.3.12. Three Year Maintenance of Field Data Collection Software (ITB Line Item 1000166080)
- 1.3.13. Three Year Maintenance of GNSS receiver. (ITB Line Item 1000166083)
- 1.3.14. Field System Training (3 Days, 10 Attendees) (ITB Line Item 1000166085)
- 1.3.15. Field System Follow Up Training (1 Day, 10 Attendees) (ITB Line Item 1000166086)
- 1.3.16. Office Processing Software Training (5 Days, 10 Attendees) (ITB Line Item 1000166087)
- 1.3.17. Office Processing Software Follow Up Training (1 Day, 10 Attendees) (ITB Line Item 1000166088)
- 1.3.18. GNSS Base Accessory Kit (ITB Line Item 1000166090)
- 1.3.19. GNSS Rover Accessory Kit (ITB Line Item 1000166089)
- 1.3.20. Survey Robotic Total Station (ITB Line Item 1000170106)
- 1.3.21. Survey Robotic Total Station Accessory Kit (ITB Line Item 1000170106)
- 1.3.22. Three Year Maintenance of Survey Robotic Total Station (ITB Line Item 10001707175)
- 1.3.23. After the pre-bid conference, Vendor is to demonstrate the operation of their equipment to ensure acceptability according to bid standards. Vendor demonstration will include a one day field trial at the TDOT Region 3 Survey office grounds. Vendor is to perform the following tasks:

- 1.3.23.1 Gather twenty minutes of static data on two previously placed control points of unknown position.
- 1.3.23.2 Download CORS data from the TDOT network (TN 31) and post process with brand software for point positions.
- 1.3.23.3 Submit a report showing state plane coordinate values, loop closures, and point standard deviation.
- 1.3.23.4 Record position of the same two points with network RTK and present state plane coordinate value for comparison.
- 1.3.23.5 Set up Base receiver on one point, check in with Rover receiver on the other point and present inverse calculation for comparison.
- 1.3.23.6 Gather topographic data of twenty points with base/rover system, download to vendor software, perform adjustment calculations, and export text file.
- 1.3.23.7 Set up robotic total station on one point, backsight on other point, and front site a new point. Occupy the new point, backsight and front site the control points.
- 1.3.23.8. Close the loop by occupying and taking measurements from the remaining point. Download to vendor software, perform adjustment calculation, and present loop closure value.
- 1.3.23.9 Stake a fictitious roadway centerline consisting of two tangents and a horizontal curve. Demonstrate slope staking routine.

Each vendor will be given two hours to complete the above tasks.

Vendor's report will summarize the above results and will be presented to TDOT regional survey staff the following day.

To schedule a field trial with the State of Tennessee, contact Mr. Donnie Sirichanto, TDOT, Design Division at (615) 532-2447.

2. PROSPECTIVE BIDDERS

2.1. General Requirements

- 2.2. Manufacturers bidding on this invitation to bid shall provide “off-the-shelf” software solutions for data collection and post processing. If the software products bid in this contract are third party software products, the State of Tennessee will contact the awarded bidder only with issues, problems, etc., and not the third party software vendor. All software products being bid shall not be beta, but officially released products. It is the responsibility of the awarded vendor to resolve any and all issues concerning the “off the shelf” software solutions for the State of Tennessee.
- 2.3. Manufacturers bidding on this invitation to bid, shall provide “off-the-shelf” hardware solutions for portable GNSS receivers, data collectors, robotic total stations, and associated peripherals. If the hardware products bid in this contract are third party hardware products, the State of Tennessee will contact the awarded bidder only with issues, problems, etc., and not the third party hardware vendor. It is the responsibility of the awarded vendor to resolve any and all issues concerning the “off-the-shelf” hardware solutions for the State of Tennessee.
- 2.4. There will be one point of contact to resolve any issues that arise from the contents of this bid, i.e., hardware, software, functionality, etc., and that will be the awarded bidder only, and not third party vendors. If the problems that arise are a result of third party vendor products, then the awarded vendor will resolve those issues for the State of Tennessee.
- 2.5. The State of Tennessee has the option to obtain, at no additional charge, hardware and software upgrades or new product lines that upgrade the functionality of requested products, to any portion of this bid package for 180 calendar days from the bid opening, should the awarded vendor or the awarded vendor’s manufacturer release any new or updated hardware and software products which are publicly released and commercially available within 180 days of the bid opening. The vendor shall provide a replacement hardware or software product that meets or exceeds the specifications of original hardware or software product for any hardware or software that is discontinued for the life of the contract.
- 2.6. The awarded vendor is responsible for oversight of all repairs, and said vendor must be authorized by the manufacturer to perform both Warranty and Non-Warranty repairs. All repairs will be performed by technicians authorized to perform both Warranty and Non-Warranty repairs. All respondents will be required to submit a letter from the manufacturer indicating they are an authorized reseller for equipment repairs both warranty and non-warranty. The letter must be current and dated within sixty (60) days of the bid opening date. If letters are not submitted with respondent’s proposal, the CPO shall require such letter to be submitted during the evaluation period.
- 2.7. The awarded vendor is responsible for providing a factory certified trainer, or equivalent, to perform all training. Each attendee will receive a certificate from

the awarded vendor after successful completion of the class. The certificate shall include the dates of the class, the class name, trainer, student, Tennessee Survey Board class number, PDH's earned, and a certified trainer's statement and signature. The awarded vendor is responsible for submitting all required information to the State of Tennessee Board of Land Surveyors for continuing education official PDH credits, and copies of the approval letters shall be sent to the State of Tennessee.

3. Hardware Technical Requirements

3.1. Data Collector, Office Processing Software, Field Data Collection Software, GNSS Receiver, Robotic Total Station, and Accessories

3.1.1. Minimum Requirements of Data Collector Options 1-3

- 3.1.1.1. Ability to send and receive data from/to the office processing software.
- 3.1.1.2. Preloaded with field data collection software as specified in section 3.1.3.
- 3.1.1.3. Minimum 4 GB of internal memory storage
- 3.1.1.4. Minimum 800 MHz processor with minimum 256 Mb RAM
- 3.1.1.5. Microsoft Windows operating system software
- 3.1.1.6. Communicate with GPS receiver (existing as shown in section 1.1 and those purchased with this contract).
- 3.1.1.7. Wirelessly interact with robotic total stations purchased as part of this contract.
- 3.1.1.8. Bluetooth capable for distances up to 10 meters.
- 3.1.1.9. Integrated GNSS receiver and 3G minimum cellular modem.
- 3.1.1.10. Connect via cell modem to a cellular network (service provided by TDOT).
- 3.1.1.11. User accessible SD card slot
- 3.1.1.12. Operates 10 hours on a single charge
- 3.1.1.13. One extra battery per data collector
- 3.1.1.14. External charger
- 3.1.1.15. COM1 RS-232C connection and USB connection
- 3.1.1.16. IP67 waterproof and dustproof
- 3.1.1.17. Meets MIL-STD-810G environmental standard

3.1.2. Minimum Requirements of Office Processing Software

- 3.1.2.1. All modules of Office Software are enabled
- 3.1.2.2. Ability to send and receive data from/to the collector.
- 3.1.2.3. Software to be a stand-alone license. No one year rental agreements for software will be considered.
- 3.1.2.4. Capable of utilizing and processing data output from existing TDOT Topcon equipment and equipment purchased as per this document.
- 3.1.2.5. Process static GNSS vector lines, reduce and adjust

conventional and GNSS RTK observations.

- 3.1.2.6. Output data files in a format that can be imported into MicroStation V8i and GEOPAK ver. 08.11.07.

3.1.3. Minimum Requirements of Field Data Collection Software

- 3.1.3.1. All modules of Field Software are enabled on data collectors including conventional, robotic, and GNSS.
- 3.1.3.2. Ability to store and map points, road stakeout and COGO routines, field to finish utilizing TDOT feature codes.
- 3.1.3.3. Ability to turn off satellites and calculate resulting PDOP and/ or GDOP during GNSS static observations.

3.1.4. Minimum Requirements of GNSS receiver

- 3.1.4.1. Multi-Frequency GNSS tracking.
- 3.1.4.2. Includes UHF internal radio for transmitting and receiving data.
- 3.1.4.3. Field configurable as a RTK base or rover.
- 3.1.4.4. Operates as a network rover with data collector and existing TDOT CORS.
- 3.1.4.5. Bluetooth capable for distances up to 10 meters.
- 3.1.4.6. RS232 serial communication port.
- 3.1.4.7. Minimum 1 GB Memory and SD card slot.
- 3.1.4.8. TDOT prefers an internal antenna on the receiver.
- 3.1.4.9. Positional accuracy: RTK (H: 10 mm + 1 ppm V: 16 mm + 2 ppm), Static (H: 3 mm + 0.5 ppm V: 5 mm + 0.5 ppm).
- 3.1.4.10. Receivers shock proof for 2 meter pole drop.
- 3.1.4.11. IP66 or greater dust and water protection.
- 3.1.4.12. Minimum 10 hour hot swappable battery life.
- 3.1.4.13. One extra battery per receiver.

3.1.5. Minimum Requirement of Robotic Total Station

- 3.1.5.1 Sends and Receives data to the data collector purchased in this contract for distances up to 1000 feet.
- 3.1.5.2 Five (5) seconds or less angle measurement accuracy.
- 3.1.5.3 Dual-axis compensator
- 3.1.5.4 Prism EDM range greater than 1000 feet with accuracy of 2 mm + 2 ppm
- 3.1.5.5 Battery operation longer than 3 hours
- 3.1.5.6 IP54 or greater dust and water protection
- 3.1.5.7 Two extra batteries per unit
- 3.1.5.8 Removable CompactFlash or SD card

3.2. Rover Accessory Kit

- 3.2.1. Receiver Battery Recharger Cradle
- 3.2.2. Composite Snap-Lock 2 meter Pole
- 3.2.3. Claw Holder System

3.2.4.Receiver to Data Collector/ PC Serial Cable

3.2.5.Receiver to PC USB Cable

3.3. Base Accessory Kit

3.3.1.Receiver Battery Recharger Cradle

3.3.2.Tripod, 2m Fixed Height with Bag

3.3.3.Receiver to Data Collector/ PC Serial Cable

3.3.4.Receiver to PC USB Cable

3.3.5.10 meter Data Collector to Receiver Serial Cable

3.4. Robotic Total Station Accessory Kit

3.4.1 Three 360° prisms with protective case

3.4.2 Claw Holder System

3.4.3 Carbon Fiber 8 ft. robotic prism pole

3.4.4 Robotic total station to PC USB cable

4. General Requirements

4.1. Any necessary modem accessories will be provided as a part of this bid. The cost for the internal modem will be included in the overall bid price for the particular unit. Wireless service for the modem will be provided by the State of Tennessee and the wireless carrier will be made known to the vendor at the time of purchase, so modem receiver configuration can be completed.

4.2. Data Collector connections to the TDOT CORS network will be tested and deemed to be fully functional before delivery.

4.3. Communications via Bluetooth technology and by cable, or equivalent, between all components is required.

4.4. If necessary, all applications for the broadcast radio FCC licenses shall be completed by the vendor and forwarded to the State of Tennessee for signatures. Completed applications shall be included with the delivery of each radio.

4.5. All serialized items shall be housed in a carrying case, if this carrying case cannot be used as a shipping container, shipping containers shall be provided in addition to the carrying case.

4.6. Receiver Requirements

4.6.1.The antenna/receiver shall mount on a standard surveying tripod having a 5/8 inch by 11 threads per inch instrument fastener.

4.6.2.The vendor shall provide a means of measuring from a survey ground point to the antenna phase center and to the antenna reference point (ARP).

Fixed height tripods/bipods and standard antenna calibrations are an accurate method of measurement.

5. Office Processing Software Requirements

- 5.1. The office processing software shall meet or exceed the most current specifications for the current version available from the manufacturer at the time of delivery, and will include all activated options within the software.

6. Field Data Collection Software Requirements

- 6.1. The field data collection software shall meet or exceed the most current specifications of the current version available from the manufacturer at the time of delivery, and will include all activated options within the software.

7. Warranty

- 7.1. The system, including equipment and software, shall be warranted against all defects in materials and workmanship. This warranty applies to all equipment and peripherals, such as radios, tripods, modems, etc. contained within this bid. The warranty shall cover all damages to the equipment and software, as a result of defects in materials and workmanship, and shall not cover abuse.

- 7.2. The warranty period shall begin upon final acceptance of the delivery by the State and shall be for a minimum duration of one year, or the manufacturer's standard warranty period, whichever is greater, from the final acceptance of the delivery.

- 7.2.1. During the warranty period, the repair/replacement of components shall be performed by shipping the equipment to the vendor

- 7.2.1.1. When the components are shipped, the items shall be shipped to and from the vendor's maintenance site by a one (1) day express delivery service. The awarded vendor shall pay the cost of shipping and shipping insurance to the vendor's maintenance site. The insurance rate shall be determined by the value established through this contract. The vendor shall pay the cost of returning the equipment (shipping and shipping insurance). The State reserves the right to transport the components directly to the repair facility instead of shipping them, however; if components are hand delivered, the State is required to pick up the items from the vendor after repair. The equipment shall be repaired and shipped to the State of Tennessee by the vendor within ten (10) working days of the receipt of the equipment. While the vendor is repairing or diagnosing a repair, the vendor shall provide loaner equipment, during the repair period, of equal or better specifications, at no additional cost to the State of Tennessee. The loaner equipment will be shipped to the State of Tennessee on the

next day after the vendor receives the damaged unit in the mail, or by hand delivery. Vendor will pay shipping charges for loaner equipment to TDOT and TDOT will pay shipping charges to return equipment to vendor.

- 7.3. Successful bidder shall provide technical support for all the hardware and the computer software bid, during normal working hours, defined as 7:30 AM CST to 5:00 PM CST M-F, excluding State holidays, by manufacturers authorized technical support staff, or equivalent. This support shall be during normal working hours, as defined above, and additional 24 hour assistance shall be available via toll free number, and by internet web page.
- 7.4. Office processing software technical support and any hardware technical support shall be provided at no cost to the State of Tennessee via phone, email, or website. Field technical support for data collectors and receivers shall be provided to previously trained State of Tennessee employees at no additional cost to the State of Tennessee, during the warranty period.
- 7.5. The awarded vendor is responsible for oversight of all repairs, and said vendor must be authorized by the manufacturer to perform both warranty and non-warranty repairs. All repairs will be performed by technicians authorized to perform both warranty and non-warranty repairs. All respondents will be required to submit a letter from the manufacturer indicating they are an authorized reseller for equipment repairs both warranty and non-warranty. The letter must be current and dated within sixty (60) days of the bid opening date. If letters are not submitted with respondent's proposal, the CPO shall require such letter to be submitted during the evaluation period.

8. Maintenance

- 8.1. After the expiration of the Warranty period, and for the life of the contract, all components of this bid specification, including equipment and software, shall be covered under a comprehensive maintenance plan that covers equipment parts, labor, and software and hardware upgrades and maintenance releases. The maintenance agreement shall cover all damages to the equipment and software, as a result of defects in materials and workmanship, and shall not cover abuse.
 - 8.1.1. Software maintenance releases are defined as software that fixes bugs in the current software version, as well as minor enhancements to the current software version.
 - 8.1.2. Software upgrades consist of all enhancements to the software including, but not limited to increasing the functionality of the software.
- 8.2. The maintenance period shall begin immediately after the warranty period expires and shall run to the end of this contract. The monthly maintenance cost will be based on the number of items purchased on this contract, which are not covered under the warranty. An item cost for each type of maintenance

agreement line item will be established, based on a per unit/per month rate.

- 8.3. During the life of maintenance agreement the equipment period, the repair/replacement of components shall be performed by shipping the equipment to the vendor.

- 8.3.1.1. When the components are shipped, the items shall be shipped to and from the vendor's maintenance site by a one (1) day express delivery service. The State of Tennessee shall pay the cost of shipping and shipping insurance to the vendor's maintenance site. The insurance rate shall be determined by the value established through this contract. The vendor shall pay the cost of returning the equipment to the State of Tennessee (shipping and shipping insurance). The State reserves the right to transport the components directly to the repair facility instead of shipping them, however if components are hand delivered, the State is required to pick up the items from the vendor after repair. The equipment shall be repaired and shipped to the State of Tennessee by the vendor within ten (10) working days of the receipt of the equipment. While the vendor is repairing or diagnosing a repair, the vendor shall provide loaner equipment, during the repair period, of equal or better specifications, at no additional cost to the State of Tennessee. The loaner equipment will be shipped to the State of Tennessee on the next day after the vendor receives the unit in the mail, or by hand delivery. Vendor will pay shipping charges for loaner equipment to TDOT and TDOT will pay shipping charges to return equipment to vendor.

- 8.4. Successful bidder shall provide technical support for all the hardware and the computer software bid, during normal working hours, defined as 7:30 AM CST to 5:00 PM CST M-F, excluding State holidays, by manufacturers authorized technical support staff, or equivalent. This support shall be during normal working hours, as defined above, and additional 24 hour assistance shall be available via toll free number, and by internet web page.

- 8.5. The awarded vendor is responsible for oversight of all repairs, and said vendor must be authorized by the manufacturer to perform both Warranty and Non-Warranty repairs. All repairs will be performed by technicians authorized to perform both Warranty and Non-Warranty repairs.

9. Manuals

- 9.1. Technical and user manuals covering all of the items bid in this specification shall be included with the delivery. These manuals shall include at a minimum the following topics: system operation, user operation of system, and user maintenance of system.
- 9.2. One (1) set of field station manuals shall be supplied with each data collector and receiver.

- 9.3. One (1) set of office processing manuals shall be supplied for each Seat of software purchased. These manuals may either be paper copies or via electronic media through software help menus.

10. Training

- 10.1. On-site Training shall consist of separate courses covering field station training and/or GNSS surveying techniques, and office processing system training.
- 10.2. Training class pre-requisites are listed in the definition of each class type.
- 10.3. The vendor shall provide all equipment (hardware & software), training materials, training manuals, supplies, and other necessary material. It will be permissible to use the equipment and manuals delivered under these specifications for training. It is the vendor's responsibility to include their trainer's travel costs; lodging, meals, etc., for the specified number of trainers for each training class in the cost of each class. The State of Tennessee will not reimburse trainers for travel expenses. The State of Tennessee will provide computers for training. The equipment being bid under this specification may be used in all training activities.
- 10.4. Training manuals will be provided for each class. Training manuals shall be made available to the State of Tennessee staff, at least 2 weeks prior to date of the classes. All printing fees will be included in the cost of the training classes. The awarded vendor will provide enough copies of each manual to satisfy the maximum number of students in each class. The State of Tennessee is free to make as many copies of these manuals, as they deem necessary, without any copyright restrictions from the awarded vendor, for use by State of Tennessee employees. The State of Tennessee has the ability to copy and paste sections from the electronic versions of these manuals for the internal use only of State of Tennessee staff. An electronic copy of each manual will be provided to State of Tennessee in *.doc and *.PDF, Adobe version 10.x or better, format. The State of Tennessee reserves the right to videotape each training session for its future use.
- 10.5. Both the State of Tennessee and the awarded vendor may make changes to the agendas of any training session, however the change must be agreed upon by both parties. The number of trainers, locations, students, etc. is defined in this section of the specification, and these are considered minimum specifications. Additional topics may be added to the class agenda, if mutually agreed upon.
- 10.6. Line items will be established for each class as specified. A line item will also be established for one day of training for each type of class, so that if modifications to future class durations are necessary, the State of Tennessee will have that flexibility.
- 10.7. Field System Training (ITB Line Item No. 1000166085)
 - 10.7.1. Number of people - Maximum of ten (10) as scheduled by the State of Tennessee

10.7.2.Duration of training - twenty-four (24) working hours minimum, maximum of 8 hours per day

10.7.3.Pre-Requisite: None

10.7.4.Number of Trainers Required: 1

10.7.5.Subject Matter:

10.7.5.1. Review of the Global Positioning System.

10.7.5.2. Overview of planning for a satellite survey.

10.7.5.3. Training on the use of field station equipment.

10.7.5.4. Satellite and robotic survey field procedures.

10.7.5.5. Overview on the use of the baseline determination routines and other computing routines.

10.7.5.6. Satellite survey errors and factors that affect observation precision.

10.7.5.7. Care and maintenance of equipment.

10.7.5.8. The planning, data collection, baseline determination and coordinate calculations for one actual survey using four field stations.

10.7.5.9. Procedures for the use of Field GNSS equipment with a statewide GNSS network.

10.7.6.Location: In Tennessee as specified by the State of Tennessee

10.8. Field System Follow-Up Training (ITB Line Item No 1000166086)

10.8.1.Number of people - Maximum of ten (10) as scheduled by the State of Tennessee

10.8.2.Duration of training - eight (8) working hours minimum, maximum of 8 hours per day

10.9. Pre-Requisite: Field System Training

10.9.1.Number of Trainers Required: 1

10.9.2.Subject Matter:

- 10.9.2.1. Review of the Global Positioning System.
- 10.9.2.2. Overview of planning for a satellite survey.
- 10.9.2.3. Training on the use of field station equipment.
- 10.9.2.4. Satellite and robotic survey field procedures.
- 10.9.2.5. Overview on the use of the baseline determination routines and other computing routines.
- 10.9.2.6. Satellite survey errors and factors that affect observation precision.
- 10.9.2.7. Care and maintenance of equipment.
- 10.9.2.8. The planning, data collection, baseline determination and coordinate calculations for one actual survey using four field stations.
- 10.9.2.9. Procedures for the use of Field GNSS equipment with a statewide GNSS network.

10.9.3.Location: In Tennessee as specified by the State of Tennessee

10.10. GNSS Office processing System Training (ITB Line Item No.1000166087)

10.10.1.Number of people - Maximum of ten (10)

10.10.2.Duration of training - forty (40) working hours minimum, maximum of 8 hours per day

10.10.3.Pre-Requisite: Field System Training

10.10.4.Number of Trainers Required: 1

10.10.5.Subject Matter:

10.10.5.1. Planning a satellite survey (detailed discussion)

10.10.5.2. Training on the use of the baseline determination routines and other provided computing routines.

10.10.5.3. Satellite survey computational procedures, including related Tennessee Coordinate System calculations.

10.10.5.4. Almanac Processing, printing and use.

10.10.5.5. Ephemerides (broadcast and precise) processing, printing

and use.

10.10.5.6. Archiving and systems back-ups.

10.10.5.7. Least squares adjustment

10.10.5.8. Statistics and probability

10.10.5.9. Coordinate systems

10.10.5.10. Precision analysis

10.10.5.11. Blunder determination procedures

10.10.5.12. Procedures for importing and exporting data to MicroStation V8i and GEOPAK.

10.10.5.13. Care and maintenance of the office processing system equipment.

10.10.5.14. Calculation of datum adjustment factors

10.10.6. Location: In Tennessee as specified by the State of Tennessee

10.11. GNSS Office processing System Follow-Up Training (ITB Line Item No. 1000166088)

10.11.1. Number of people - Maximum of ten (10)

10.11.2. Duration of training - eight (8) working hours minimum, maximum of 8 hours per day

10.11.3. Pre-Requisite: GNSS Office processing System Training

10.11.4. Number of Trainers Required: 1

10.11.5. Subject Matter:

10.11.5.1. Planning a satellite survey (detailed discussion)

10.11.5.2. Training on the use of the baseline determination routines and other provided computing routines.

10.11.5.3. Satellite survey computational procedures, including related Tennessee Coordinate System calculations.

10.11.5.4. Almanac Processing, printing and use.

- 10.11.5.5. Ephemerides (broadcast and precise) processing, printing and use.
- 10.11.5.6. Archiving and systems back-ups.
- 10.11.5.7. Least squares adjustment
- 10.11.5.8. Statistics and probability
- 10.11.5.9. Coordinate systems
- 10.11.5.10. Precision analysis
- 10.11.5.11. Blunder determination procedures
- 10.11.5.12. Procedures for importing and exporting data to MicroStation V8i and GEOPAK.
- 10.11.5.13. Care and maintenance of the office processing system equipment.
- 10.11.5.14. Calculation of datum adjustment factors

10.11.6. Location: In Tennessee as specified by the State of Tennessee

10.12. Miscellaneous Training Items

10.12.1. A factory certified trainer, or equivalent, shall perform all training. Each attendee will receive a certificate from the awarded vendor after successful completion of the class. The certificate shall include the dates of the class, the class name, trainer, student, Tennessee Survey Board class number, PDH's earned, and a certified trainer's statement and signature. All respondents will be required to submit letters from the manufacturer's in the category being proposed indicating they are authorized resellers for service. The letter(s) must be current and dated within sixty (60) days of the bid opening date. If letters are not submitted with respondent's proposal, the CPO shall require such letter to be submitted during the evaluation period.

10.12.2. All training classes will be submitted by the awarded vendor to the State of Tennessee Board of Land Surveyors for continuing education official PDH credits, and copies of the approval letters shall be sent to the State of Tennessee.

10.12.3. Training shall be scheduled by the State of Tennessee staff and the vendor's representatives as necessary. The date of the training classes may be adjusted or rescheduled by the State of Tennessee, as necessary, with 48 hours advance notice to the awarded vendor.

10.12.4. Training classes to be held at the four TDOT regional offices (Jackson, Nashville, Chattanooga, and Knoxville). Class size to be limited to ten (10) students. If a regional office has more than ten (10) students, then additional classes shall be scheduled. The vendor shall coordinate with the regional surveying supervisor to finalize training dates and number of classes needed.

11. Delivery

- 11.1. Delivery shall not be considered complete until purchased Items have been received and are fully operational, and approved by the State of Tennessee. Payment will be issued in phases as purchase orders are processed and approved by the State of Tennessee staff. As the items of a purchase order are approved by State personnel, then payment will be rendered on those items.
- 11.2. Delivery of all equipment and software will be coordinated through the State agency placing the order, and delivered anywhere throughout the State of Tennessee as directed by the State of Tennessee.
- 11.3. The software shall be installed anywhere throughout the State of Tennessee by State of Tennessee staff. The State of Tennessee staff will be trained by the vendor on the installation of all types of software provided, so that the State of Tennessee staff will be able to install the software anywhere throughout the State of Tennessee. The vendor will be required to provide assistance to the State of Tennessee staff installing software, at no additional cost, if required.
- 11.4. Delivery shall be made within approximately thirty (30) days after receiving order.